

Volume 1: Synthesis Report

Second Annual Report to the
Minister of Environment and Climate Change

Prepared by the Net-Zero Advisory Body

December 2024



Table of Contents

Acknowledgments	3
Message to the Minister of Environment and Climate Change	4
About the Net-Zero Advisory Body	6
Engagement and collaboration	7
Climate's bottom line: carbon budgeting and Canada's 2035 target	9
Closing the gap: reaching Canada's 2030 emissions target	12
Lines of inquiry	17
Conclusion	22
Glossary	23

© His Majesty the King in Right of Canada, as represented by the Minister of Environment and Climate Change, 2024

Cat No.: En1-95E-PDF
ISSN: 2818-5129

Disclaimer: The views expressed in this report represent the independent views of the Net-Zero Advisory Body. They do not represent the opinions, decisions, or the stated policies of Environment and Climate Change Canada.

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from Environment and Climate Change Canada's copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

Environment and Climate Change Canada
Public Information Centre
Place Vincent Massey
351 St. Joseph Boulevard
Gatineau, QC K1A 0H3

Toll free: 1-800-668-6767
Email: enviroinfo@ec.gc.ca

Aussi disponible en français

Acknowledgments

This report was developed by the members of the Net-Zero Advisory Body (NZAB), who collectively reside on the territories of Treaty 2 and Treaty 13, the traditional territories of the Mississaugas of the Credit, the Anishinaabeg, the Cree, the Dakota, the Oji-Cree Nation, the Chippewa, the Haudenosaunee and the Wendat Nations, the homeland of the Métis Nation, the unceded traditional territories of the x^wməθk^wəyəm (Musqueam), Sk̓w̓x̓w̓ú7mesh (Squamish), and səliiwətaʔ (Tseil-Waututh), Passamaquoddy, Wolastoqiyik (Maliseet), and Mi'kmaq nations, and a territory with a long history of meeting and exchange among many nations (Montréal).

Our advice would not be possible without the hundreds of individuals and organizations, including Indigenous partners, who have shared their time and insights. We also want to recognize the valuable contributions of federal, provincial and territorial officials who supported us through briefings and information-sharing.

We thank past members who have departed NZAB since the publication of our first annual report: Linda Coady, John Wright, Marie-Pierre Ippersiel and Dan Wicklum. We also thank Anne de Bortoli for her important contributions.

Message to the Minister of Environment and Climate Change



Dear Minister Guilbeault,

We are pleased to submit the second annual report of the Net-Zero Advisory Body, as required under the [*Canadian Net-Zero Emissions Accountability Act*](#).

Last year, you wrote to us asking for advice on how to achieve Canada's 2030 target and the setting of Canada's 2035 target. The 2030 and 2035 targets are crucial milestones to ensure Canada is on the right path to achieve net-zero greenhouse gas emissions by 2050. Efforts to mitigate climate action over the next decade will be critical to setting Canada up for success on our pathway to net-zero, including the realization of benefits such as jobs in the growing renewable energy sector, more affordable and reliable electricity, and improved health through cleaner energy.

To inform our advice, we engaged industry experts, academics, labour representatives, Indigenous partners and non-governmental organizations. We worked closely with the Canadian Climate Institute, which provided analytical and modelling support, and held a workshop on carbon budgeting with international and domestic experts.

Our reports on these topics, [*Climate's Bottom Line: Carbon Budgeting and Canada's 2035 Target*](#) and [*Closing the Gap: Reaching Canada's 2030 Emissions Gap*](#) were pre-published on our website during Climate Week in September 2024, and comprise Volumes II and III, respectively, of this annual report. Our second annual report also includes an overview of activities we have undertaken since our last annual report and our strategic priorities over the next 12 months.

We sincerely hope that our advice, which encourages the federal government to redouble its efforts and implement new measures to reach its 2030 climate target, and to adopt a 2035 target and tools, and policy measures comparable to our trading partners, will assist Canada in reaching its climate targets.

Simon Donner and Sarah Houde
Co-chairs of the Net-Zero Advisory Body



About the Net-Zero Advisory Body

Launched in February 2021 and formalized under the [Canadian Net-Zero Emissions Accountability Act](#) in June 2021, the Net-Zero Advisory Body's mandate is to provide independent advice to the Minister of Environment and Climate Change with respect to achieving net-zero emissions by 2050, including:

- greenhouse gas (GHG) emissions reduction targets for 2030, 2035, 2040, and 2045
- emission reduction plans from the Government of Canada, including measures and sectoral strategies that the government could implement to achieve a GHG emissions target
- any matter referred to it by the Minister

We also have the mandate to conduct engagement activities related to achieving net-zero emissions. Our advice must consider a range of factors, including environmental, economic, social, and technological, and the best available scientific information and knowledge respecting climate change, including Indigenous knowledge.

NZAB members

[Catherine Abreu](#)

Director
International Climate Politics Hub

[Michael Bernstein](#)

Executive Director
Clean Prosperity

[Louise Comeau](#)

Iris Communications and Senior Advisor
Re.Climate

[Simon Donner, Co-Chair](#)

Climate Scientist and Professor
University of British Columbia

[Robert Hornung](#)

Independent Consultant

[Sarah Houde, Co-Chair](#)

Entrepreneur

[Shianne McKay](#)

Senior Project Manager
Centre for Indigenous Environmental Resources

[Karen Ross](#)

Executive Director
Farmers for Climate Solutions

[Gaëtan Thomas](#)

President and CEO
Conseil Économique du Nouveau-Brunswick

Engagement and collaboration

In March 2024, we were pleased to publish our [What We Heard: 2022–2023 Engagement Report](#) to share the findings from our engagement efforts for that period. These engagement activities are fundamental to our work and are critical for cultivating the collective commitment and shared leadership across all orders of government, Indigenous Peoples, the private sector, and civil society, that is required to inform and drive pathways to net-zero.

Since our first annual report, we have continued to work collaboratively with groups and organizations with complementary mandates to ours, both internationally and within Canada, including other entities tasked with providing advice to the Government of Canada. We are a member of the [International Climate Councils Network](#), which fosters collaboration amongst climate councils around the world. We worked closely with the [Sustainable Finance Action Council](#) and the [Canada Electricity Advisory Council](#) during their mandates to share perspectives and inform our respective work, and we look forward to collaborating with the Sustainable Jobs Partnership Council once established.

We regularly partner with the [Canadian Climate Institute](#) on engagement and research focused on putting Canada on a path to achieve net-zero by 2050.

To support our research activities, [16 projects](#) are being undertaken with the financial support of the Government of Canada, through the Environmental Damages Fund's Climate Action and Awareness Fund. To support our engagement mandate, [6 youth-led net-zero engagement projects](#) were identified by NZAB and funded by Environment and Climate Change Canada.

Building Relationships with Indigenous Peoples

Indigenous Peoples and their traditional ways of life are disproportionately impacted by climate change—from extreme weather to coastal erosion to the loss of sea ice to melting permafrost and biodiversity loss.¹ The decline in the availability of the animals and plants that have provided sustenance since time immemorial has threatened food security and the passage of cultural knowledge. Climate solutions such as electric vehicles and heat pumps are not always suitable for Indigenous Peoples, particularly those living in Northern and remote areas who depend on small aircrafts, boats and winter ice roads for outside goods and essential health services, or on generators and diesel for home heating and power. Indigenous self-determined climate solutions that reflect Indigenous knowledge and regional contexts are essential.

Despite these challenges, First Nations, Inuit, and Métis are leading action to address climate change. With solutions grounded in deep intergenerational knowledge, relationships with the land and waters, and community leadership, we have much to learn from Indigenous Peoples about pathways to net-zero.

NZAB is partnering with Cambium Indigenous Professional Services, a First Nations-owned and operated organization, to deepen our understanding of Indigenous perspectives on net-zero pathways in Canada. Cambium Indigenous Professional Services also provided us with Indigenous awareness training, which has enhanced our understanding of the unique, multifaceted, and difficult realities that many Indigenous Peoples face, and the need for net-zero pathways that understand and respect these realities.

Since our first annual report, we have engaged with Indigenous partners by attending dialogues, seeking written submissions, and participating in Indigenous-led events. We are deeply grateful for this engagement, through which we have learned about the experiences and increasing leadership role of Indigenous People in renewable energy. For example, in 2022, First Nations, Métis, and Inuit groups were partners or beneficiaries in nearly 20% of Canada's existing electricity-generating infrastructure,² with the

number significantly increasing in the last two years. We learned about the barriers that Indigenous Peoples continue to face in participating in renewable energy projects and other opportunities associated with the energy transition. We learned about the need for participatory decision making with Indigenous Peoples, including embracing Indigenous ways of knowledge, providing specific Indigenous opportunities (e.g. in procurement), and ensuring sufficient engagement early on and throughout energy projects with Indigenous Peoples and their representative institutions.

The First Nations Major Project Coalition has outlined that project success is “directly related to strong Indigenous partnerships” and “repeatedly highlighted that Indigenous consent—incorporated at all levels of a major project—is a competitive advantage for companies and countries seeking to raise capital, expedite regulatory and permitting processes, and increase market share.”³ The International Energy Agency recognizes that enhancing the implementation of human rights standards, as well as Indigenous rights, can mitigate operational disruptions across several projects, including critical mineral operations. Many provinces, including British Columbia, Alberta, Saskatchewan and Ontario have also acknowledged the value in this approach by making Indigenous equity ownership partnerships a requirement for new power projects.

We also heard examples of how the transition to net-zero is not just about lowering emissions for Indigenous Peoples, but also about economic, environmental and social benefits for their communities. Clean energy benefits include reliable, secure, and affordable energy, cleaner air, as well as economic opportunities that promote sovereignty.

Going forward, we will seek to establish spaces for more meaningful engagement with Indigenous Peoples. We know there are many Indigenous voices to hear and much more work to do to ensure our advice is adequately informed by, and relevant to, the lived experiences of First Nations, Inuit, and Métis in Canada.

1 Climate Atlas of Canada. [Indigenous Knowledges and Climate Change](#).

2 Indigenous Clean Energy. 2022. [Waves of Change: Indigenous clean energy leadership for Canada's clean, electric future](#).

3 First Nations Major Projects Coalition. 2023. [The Values Driven Economy Post Conference Report](#).

Climate's bottom line: carbon budgeting and Canada's 2035 target

The *Canadian Net-Zero Emissions Accountability Act* requires the Government of Canada to set national GHG emissions reduction targets for milestone years to achieve net-zero by 2050. In setting these targets, the Minister must take into consideration NZAB's advice, as well as the best scientific information available, Canada's international commitments, and Indigenous knowledge.

In October 2023, the Minister requested advice from NZAB to inform development of a 2035 target and ensure it is compatible with net-zero emissions by 2050. Volume 2 of this annual report, [Climate's Bottom Line: Carbon Budgeting and Canada's 2035 target](#), offers 3 pieces of advice in response to this request.

1. Develop a carbon budget

Our first advice is that **the government should develop a national carbon budget**, reflecting the total greenhouse gas emissions that Canada will emit over time. Carbon budgets are used by other countries to better track the effect of policy decisions on the climate and the consequences of delaying action.

A carbon budget is the most direct way to represent the impact our emissions have on the planet. Annual targets only apply to the amount of emissions in one year. **What matters to the climate is the total emissions we put in the air between now and when we stop emitting.**

Under the Paris Agreement, countries agreed to keep global warming well below 2°C and to pursue efforts to limit it to 1.5°C. Science can tell us the amount of carbon dioxide left to emit before the world passes these limits. If we “spend” beyond this global carbon budget, we will pass the temperature limits. Adopting a carbon budget for Canada will

better acknowledge the reality of climate change and better place our climate action within a global context.

Carbon budgets are already being used by different levels of government around the world with the United Kingdom, France, New Zealand, Finland and Ireland having already adopted different forms of national carbon budgets. In Canada, jurisdictions that use or are considering using some form of a carbon budget include Manitoba, Toronto, Montreal, Edmonton and Vancouver.

Volume 2 provides details on how to develop such a budget and introduces the methods to calculate it. We recommend using Canada’s past emissions and existing legislated target of net-zero by 2050 to establish the national budget. As this budget will exceed Canada’s fair share of global emissions, we also recommend Canada track and address the excess emissions.

2. Adopt a target of 50% to 55% below 2005

Alongside the carbon budget, we **recommend that the government adopt a target of 50% to 55% below 2005 levels for 2035**. The proposed target range is consistent with our carbon budget analysis and meets the Paris Agreement requirement to increase ambition. The target will help Canada keep pace with the ambitious climate goals of its G7 partners and other major trading partners. For example, at the time of publication, the United States has not announced its 2035 target, but it already has a target of 50% to 52% below 2005 levels in 2030. Other nations, including the United Kingdom and European Union nations, have announced or are developing much more ambitious targets.

Meeting the target will require greater ambition on decarbonization from the federal government, as well as from provinces, territories, municipalities and the private sector. In choosing a target, **we tried to find a balance between being ambitious and technically feasible**. We also considered the multiple benefits that climate action can provide to the environment, human health and the economy.

This target, like previous targets, is a “net emissions” target. This means that while direct domestic reductions of emissions should be the primary focus, reaching the target will also require additional actions such as negative emissions and internationally financed emissions reductions.

3. Address Canada's excess emissions

NZAB encourages the government to address Canada's excess emissions through means such as international support for climate action and removal of carbon dioxide from the atmosphere.

Canada is one of the world's top ten emitters, both per capita and in absolute emissions. This means we have already consumed our fair share of the global carbon budget remaining to avoid the 1.5°C limit in the Paris Agreement, and are on pace to consume our fair share of the global carbon budget remaining to avoid the 2°C limit by the end of the decade. In addition to adopting the proposed carbon budget, we recommend that Canada acknowledge that the budget is more than our fair share and develop a plan to address the excess emissions.

There are different ways to address these excess emissions. The government should start now to estimate that amount and design strategies to address them. This will bring clarity and credibility in Canada's domestic and global efforts. Further consultations will be necessary and NZAB will be doing additional work in this area over the coming year.



Closing the gap: reaching Canada's 2030 emissions target

In July 2023, the Minister requested advice from NZAB on additional measures that the Government of Canada could implement to achieve its 2030 emissions reduction target. Our analysis finds that meeting the 2030 target will be a challenge, but it is possible. The latest available data shows the emissions are 8% below 2005 levels. While this represents real progress, there is a long way to go to the 40% to 45% reduction target. More aggressive and sustained action is necessary to reach our 2030 emissions target and to shift to a long-term net-zero pathway.

Our advice, detailed in Volume 3 of this report, [Closing the Gap: Reaching Canada's 2030 Emissions Target](#), focuses on how to finish what has been started, improve what exists, and then implement new policies. **Meeting that 2030 target will also give us the best chance to achieve the 2035 target** and the long-term objective of net-zero emissions.

In general, **we believe it is more effective for the government to focus on a small number of the highest – impact actions and to implement them quickly** given the short time until 2030 and the length of time it takes to implement new policies.



1. Finalize announced measures

Our first piece of advice is to **fully** implement all announced measures, such as clean economy investment tax credits, policies to reduce oil and gas sector emissions, the Canada Green Buildings Strategy, the Clean Electricity Regulations, and landfill methane emissions regulations, to name a few.

The federal government's own analysis indicates that even if all the policies and sectoral goals are fully implemented, and work as intended, Canada will at most achieve a 36% reduction.

2. Address negative interactions

We advise the government to **address negative interactions**. As Canada progresses in responding to climate change, the number of climate policies increase. Some of these policies will interact in beneficial ways, but some have the potential for counter-productive interactions.

For example, as the government finalizes the proposed oil and gas sector emissions cap and Clean Electricity Regulations, **special attention will need to be paid to minimizing negative interactions**, such as actions that could lead to a surplus of cheap carbon credits for sale in the industrial pricing system, which would decrease the incentive for companies to reduce emissions.

To offer another example, if the light-duty zero-emission vehicle sales mandate, the proposed Clean Electricity Regulations and the proposed oil and gas sector emissions cap drive fuel carbon intensity reductions greater than the *Clean Fuel Regulations*, the compliance credits created under the *Clean Fuel Regulations* could weaken the price signal in these adjacent policies, resulting in fewer reductions for each policy than if each policy was implemented in isolation.

Eliminating or minimizing these negative interactions can therefore create more certainty for large emitters and reduce GHG emissions. Modifying existing policies to rectify negative interactions would take less time than introducing new policies and would require fewer public sector resources than creating new emissions mitigation policies.



3. Strengthen industrial carbon pricing

We recommend that the federal government **strengthen existing industrial carbon pricing to reduce uncertainty, increase transparency, address potential negative interactions, and ensure compatibility with Canada’s 2030 emissions reduction target.** Compared to creating new policies, improvements can be made quickly.

The Output-based Pricing System is one half of the federal government’s carbon pollution pricing system (the other is the federal fuel charge). The system is designed to ensure there is a price incentive for industrial emitters to reduce their GHG emissions and spur innovation, while maintaining competitiveness and protecting against “carbon leakage”, that is, the risk of industrial facilities moving from one region to another to avoid paying a price on carbon pollution. The federal carbon pricing serves as a backstop for provinces and territories, who can choose to implement their own industrial carbon pricing system which needs to be at least as rigorous as the federal system, or they can implement the Output-based Pricing System.

Accelerating the Output-based Pricing System review process scheduled to begin in 2026 and signaling that strengthening the performance benchmarks will provide companies and investors with policy certainty. A further set of tools to provide companies with certainty so they can make low carbon investments are carbon contracts for difference, such as those made through the Canada Growth Fund. They guarantee a minimum carbon price so that any associated revenues from low carbon investments are bankable, which lowers the cost of capital and makes it more likely that these emissions reducing projects can proceed. We see potential for even more results. **Without strengthening the performance standards and employing carbon contracts for difference, a meaningful share of the emissions reduction that is currently forecasted by the government is unlikely to materialize.**

4. Secure additional emissions from the oil and gas sector

The oil and gas sector is Canada’s largest emitting sector, responsible for almost one-third of Canada’s emissions. It has also seen the biggest increase in emissions since 2005. **More can and should be done to address oil and gas sector emissions.** Our members presented two options for how to tackle this.

One is to strategically strengthen the planned oil and gas sector emissions cap by expanding its coverage and tightening some features of the design. The proposed changes, while subtle, can reduce the risk of credit oversupply, and provide greater flexibility for operators in the sector. With 31% of emissions coming from this sector, we need more results in terms of reduction, otherwise other sectors will need to compensate.

Another option is to improve the Output-Based Pricing System performance standards in all regulated sectors, including oil and gas, and implement an expanded and broad-based carbon contracts for difference program. This approach avoids the uncertainty inherent in creating new regulations that could face years of legal challenges.

5. Evaluate and pursue additional measures

Even if all these measures are implemented, **more needs to be done**. To address the remaining gap, the government should consider pursuing one or more of the following policies:

- strengthen oil and gas methane regulations to reduce emissions by 80% from 2012 levels
- finalize and publicly state the post-2030 carbon price schedule and adjust to inflation
- promote policies that encourage shifts to less-emitting transportation modes, for example, rail and public transit
- phase down the sale of new and replacement fossil fuel heating and cooling devices in residential and commercial buildings beginning no later than 2030
- create a building performance standard for new commercial buildings

We also recommend that the federal government further study:

- increasing stringency of the *Clean Fuel Regulations*
- implementing a stronger medium- and heavy-duty vehicle sales standard
- implementing an efficiency mandate for low-temperature industrial heat
- ambitiously targeting light-duty vehicle emission reductions



Everyone has a role to play

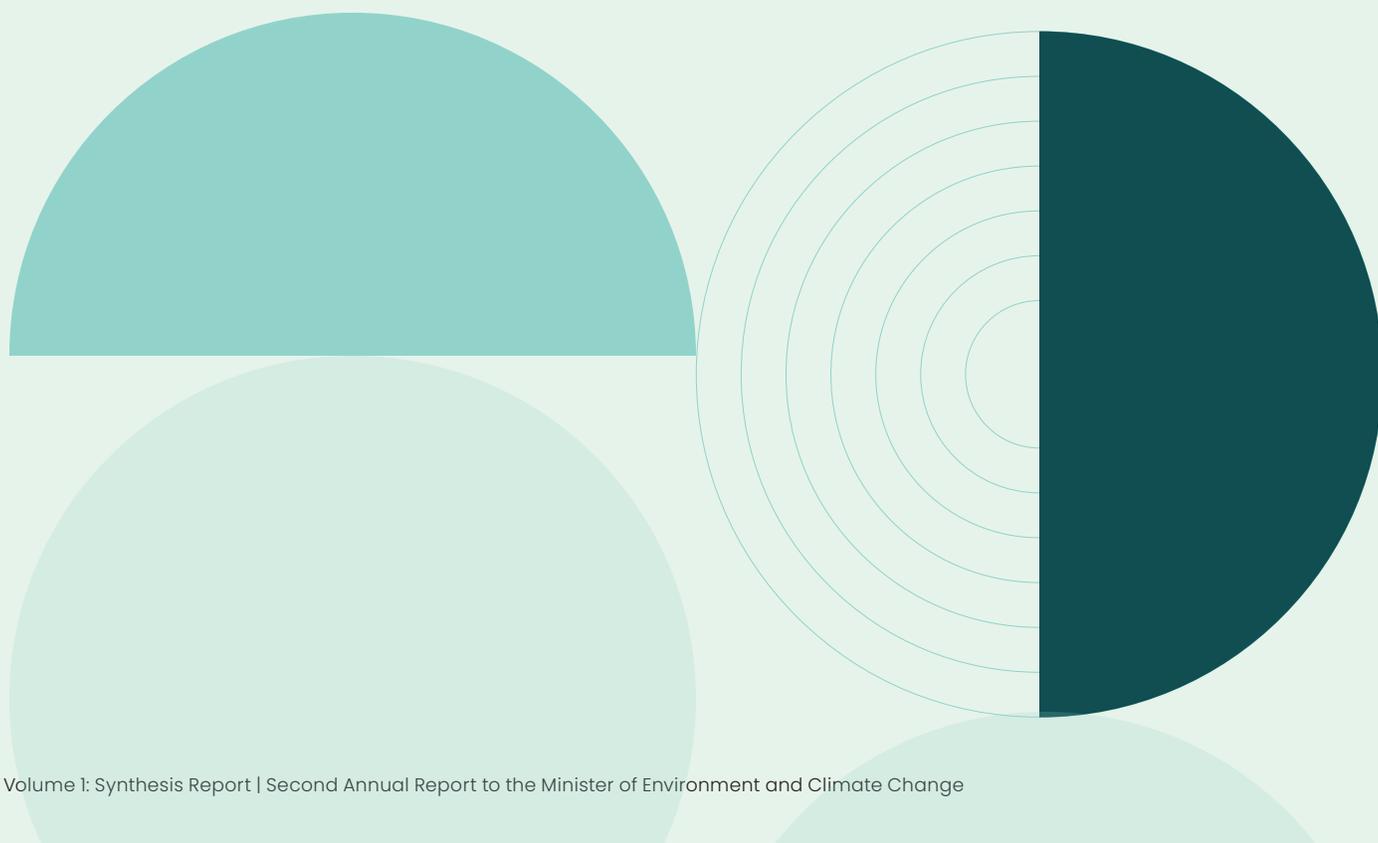
It is important to highlight one of NZAB's foundational values: to **recognize and respect regional differences and circumstances**.

All major provincial climate legislated policies were considered in the modelling conducted for our analysis. However, the federal government alone will not be able to achieve Canada's climate change targets. **All of Canadian society has a role to play**. Beyond the federal government, provinces, territories, municipalities, Indigenous governing bodies, the private sector, civil society and experts, including Indigenous knowledge holders and scientists, all have important roles in bringing Canadians along to realize our 2030 and 2050 decarbonization goals. Many opportunities exist to align efforts among these players, leverage existing responsibilities, and grow capacity to achieve our shared objectives.



Lines of inquiry

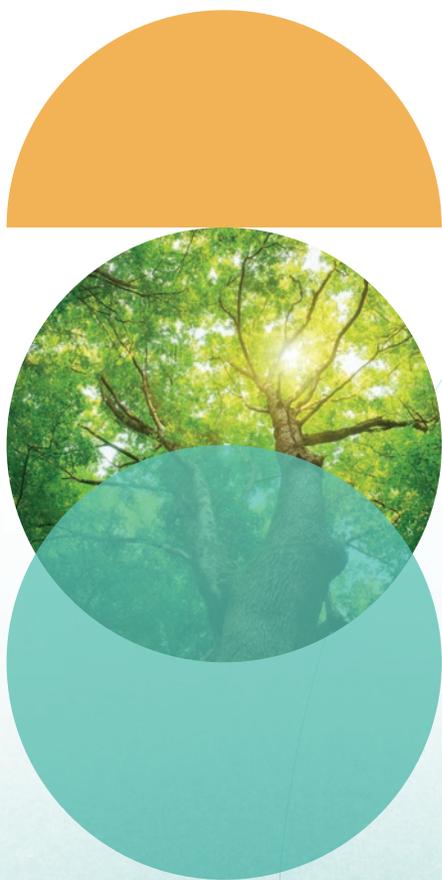
While our focus since our first annual report has been on developing advice to close the 2030 emissions gap and setting the 2035 emissions reduction target, we continued work on our ongoing lines of inquiry from the first report: net-zero energy systems, net-zero governance and net-zero industrial policy. Building on our advice to address Canada's excess emissions, we have also commenced work on a new line of inquiry on the ways to address those emissions. Work on these lines of inquiry will set the stage for advice in our third annual report.



Net-zero energy systems

NZAB has defined energy systems as the production, conversion, transmission, distribution, storage and consumption of energy required to yield a functional, sustainable, and responsible energy system that meets demand and generates net-zero emissions.

A cornerstone of our net-zero energy systems advice in our first annual report is the need for the government to develop a vision for net-zero energy systems that describes what a net-zero future looks like for Canadians. We followed up on this advice by conducting engagement, including hosting a net-zero energy systems vision workshop with Indigenous and youth climate leadership experts, energy systems modelers, academics and policy analysts with energy systems knowledge. Key messages we heard at this session included how a vision could help drive the necessary demand and investment for the transition, and the importance of acknowledging and respecting Indigenous People's rights and ensuring their perspectives and knowledge are reflected in a vision.



In addition to this engagement, we commissioned the Energy Super Modelers and International Analysts to analyze assumptions in different oil and gas projections to 2050, notably the downward impact that international climate policies are projected to have on oil and gas demand during the energy transition to net-zero and potential areas for future research.

NZAB also co-hosted a COP 28 panel discussion with the Canadian Climate Institute which explored the progress made on energy transition internationally and in Canada, and how to continue the momentum of COP28 discussions to triple renewable energy capacity, double the rate of energy efficiency and transition away from fossil fuels. A summary of the remarks can be found in our [What We Heard: 2022-2023 Engagement Report](#).

Through our engagement, we consistently heard that energy systems transformation must be rooted in systemic change that continues to advance equity participation by Indigenous Nations, communities, and governments to fully realize the benefits and help ensure the transition seizes the opportunities for reconciliation and addresses current inequities. There is much to be learned from the Indigenous Peoples who have been communicating the foundational value in building relationships for some time and that the transition to net-zero needs to be about more than reducing greenhouse gas emissions.

Our research and engagement activities confirmed the value of developing a vision, which will be the future focus of the energy systems line of inquiry. Our view is that the transition to a net-zero future is about much more than emissions reductions, with the unparalleled opportunity to provide a range of potential benefits to individuals in all communities. We see an energy systems vision as a means to provide greater clarity, understanding and optimism on the future of energy. It can highlight the benefits that the energy transition can bring to all in our daily lives, over and above the benefits of emissions reductions, including:

- greater autonomy through more choice in energy systems
- jobs in the growing energy sector
- improved health through cleaner energy while preserving ecosystems
- more affordable and reliable electricity



Net-zero governance

NZAB has defined net-zero governance as the network of institutional strategies, capacities and relationships required – both inside and outside of government – to achieve net-zero emissions by 2050. We have prioritized governance in recognition that, for Canada to meet its net-zero emissions goal by 2050, all parties of society have a role to play, including all levels and departments of government.

In our first annual report, we advised that the Government of Canada should direct all federal agencies, departments and Crown corporations to publicly articulate their role in helping Canada achieve net-zero emissions and empower them to play a more ambitious role by formalizing net-zero objectives in mandates and changing mandates if required. Following our first annual report, we identified the need for a clearer picture of the current and potential contributions to Canada's net-zero commitment by various federal entities. To this end, we commissioned PricewaterhouseCoopers LLP to interview a subset of federal entities to learn about their respective efforts, progress, and challenges in advancing net-zero governance, as well as to host a roundtable with interviewees to foster a collaborative discussion aimed at strengthening our understanding of net-zero governance strategies and how best to overcome common obstacles. We anticipate this research will allow NZAB to provide additional insights on how federal entities can more effectively help Canada achieve its net-zero commitment.

We have also begun a longer-term project exploring the impact of current and potential provincial and territorial contributions to realizing Canada's climate objectives in collaboration with the Canadian Climate Institute. We recognize that the federal government cannot, and should not, achieve these objectives through its action alone. Provinces and territories are essential partners in developing and implementing regionally appropriate approaches to decarbonization. Indeed, they have jurisdiction over many key facets of the energy transition, from electricity generation to natural resource development. However, not every province and territory has the same needs or capacities, hence the need for flexibility. Ultimately, this work will inform future advice to the Minister on how to collaborate more effectively with provinces and territories on climate mitigation policy to achieve Canada's net-zero goal.

Finally, under this line of inquiry, we have commissioned research to better understand the emissions reductions potential from the agriculture sector. Our goal is to analyze the long-term emissions profile and the social acceptance dimensions of a more sustainable agriculture sector.



Net-zero industrial policy

NZAB has defined industrial policy as any set of deliberate measures to redirect economic activity to solve problems that, left to itself, the market will not address. A modern industrial policy is an institutionalized process for strategic collaboration between industry and government and for learning in the face of uncertainty.

Building from initial advice in our first annual report, the Minister has requested that we provide advice on concrete steps the Government of Canada can undertake to advance net-zero industrial policy. In response, NZAB undertook two research projects to illuminate international best practices and domestic views on pathways forward for a Canadian net-zero industrial policy. This work focused on two of the four priority sectors previously identified by NZAB: electric vehicles and batteries, and hydrogen.

The international best practices project surveyed the approaches of the United States, Japan, and Germany and found that all three coordinated whole-of-government policy mixes to bolster technological capabilities of domestic firms in targeted low-carbon supply chains over time. Supply-side tools bolstered firms' innovation inputs via research and development grants, tax credits, loans, equity, skills investments, joint venture requirements for foreign direct investment supports, and supporting and connecting upstream suppliers. Demand-side tools shaped market demand for domestic firms' innovative products via consumer incentives, procurement, regulations, standards,

carbon pricing, or matchmaking producers and end users. Lastly, coordinating these instruments via regularized information flows with the private sector and across government departments harnessed institutional capacities and cultures of cooperation built up from decades of industrial policy practice.

The domestic scan project examined how the organizational culture and policy capacity of federal departments shape Canadian net-zero industrial policy to identify potential pathways to advance a more coherent and strategically targeted industrial policy. We interviewed senior federal and provincial officials, industry actors, and Indigenous partners. They indicated a common desire for the federal government to focus priorities on technology-specific goals and a shared preference for more structured coordination mechanisms across government departments, and with provinces, territories, Indigenous governing bodies, and industry, for demand-side and supply-side instruments. There was also widespread agreement on the need to advance inclusive growth that better coordinates with Indigenous priorities and serves disadvantaged communities.

In undertaking these two research projects, we were struck by the keen level of interest by all those whom we interviewed in creating a more coherent and inclusive net-zero industrial policy. NZAB is distilling the findings of these two projects to generate insights and advice for our next annual report.

Excess and negative emissions

Our advice on the 2035 target included a recommendation to address Canada's excess emissions. Our work in this new line of inquiry will aim to develop a framework that can guide the assessment of options to address those emissions, including carbon dioxide removal, for example,

via a diverse set of solutions ranging from afforestation to like direct air capture. We are collaborating with the Canadian Climate Institute to advance this work in order to provide advice to the Minister.

Conclusion

Our planned work described above builds on our previous advice and reflects the role that all of Canadian society must play for Canada to achieve its climate change commitments, including all levels of government and all sectors. It also reflects both the value in—and opportunity for—partnerships with mutual goals that meet climate objectives, including industry and government partnering on industrial policy, and facilitating collaboration on energy projects by describing the net-zero energy systems future and its many benefits beyond emissions reductions.

NZAB will continue to fulfill our legislated mandate to provide our best advice to the Minister on how to achieve net-zero emissions by 2050 or on any additional matters that the Minister may refer to us. To do this, our work will be informed by what we hear in our engagement activities and grounded in our ongoing research to ensure we have the best available scientific information and knowledge, including Indigenous knowledge.



Glossary

Carbon budgets specify the cumulative amount of GHG emissions permitted over a period of time to limit a specific temperature increase. Carbon budgets differ from point-in-time targets in that emissions not only have to fall to a certain level by a particular year, but the overall emissions allowed in a given period are also limited.

Carbon contracts for difference provide a guaranteed minimum price for carbon credits sold by a company on the carbon market. When the market price is lower than this minimum, the entity offering the contract compensates the company for the difference, reducing its investment risk. Conversely, if the market price exceeds the guaranteed minimum, the company reimburses the difference to the entity offering the contract, enabling both parties to share in the profits.

Emissions gap is the disparity between an emissions reduction target by a certain deadline and the estimated emission reductions that are achievable within the same timeframe.

Excess emissions are the remaining emissions when comparing a fairness-based carbon budget with a target-based carbon budget.

Fairness-based carbon budgets draw directly from scientific analyses of the remaining global carbon emissions for a specified chance to avoid a given level of warming. Under this approach, Canada is allocated a fair share of the remaining global carbon budget based on historical contribution to global emissions and capacity to act.

Investment tax credits incentivize private sector investment in specific sectors by offering tax breaks, in terms of less delayed payments, on a portion of investments.

Negative emissions⁴ are the removal of GHGs from the atmosphere by deliberate human activities, which is in addition to the removal that would occur via natural carbon cycle processes.

Oil and gas sector emissions cap focuses on reducing emissions by setting a maximum allowable emission limit on the oil and gas operations.

Output-based pricing system establishes emissions limits for regulated facilities based on their emissions-intensity performance standards. Facilities emitting below their limit earn credits they can sell or save. Those exceeding their limit must compensate for excess emissions. This system ensures all industrial emissions are incentivized under the carbon price, while limiting costs to maintain competitiveness and prevent carbon leakage.

Point-in-time targets are emission targets for a given year (2030, 2035, etc.).

Zero-emission vehicles are vehicles that have the potential to produce no tailpipe emissions such as battery-electric and hydrogen fuel cell powered vehicles. They may still have a conventional internal combustion engine but must be able to operate without using it. Emissions may still be generated during the life cycle of the vehicle, for example during production of the vehicle and their components.

Zero-emission vehicle sales mandate is a regulatory policy that mandates automakers and importers to sell a certain percentage of vehicles with zero emissions within a specified timeframe.

4 Glossary of Terms. [IPCC](#).

